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III. — *On the Equivalence of Rhythmical Bars and Metrical Feet.*

BY MILTON W. HUMPHREYS,

PROFESSOR IN THE UNIVERSITY OF VIRGINIA.

THE object of this paper is not to establish any positive results, but to contribute something towards clearing the way of needless obstacles to investigation.

To avoid numerous digressions, I shall make some preliminary observations regarding points that will arise during the discussion. Some of these remarks I shall have to make in dogmatic form, as the presentation of the evidence would require much space.

The word 'rhythm' is used in various ways by writers, ancient and modern. Some recent writers have created confusion by overlooking this fact, and assuming that the thing itself varied with the varying use of the word. Many have concluded that ancient rhythm is essentially different from modern. One author, Maximilien Kawczynski, even declares (*Essai comparatif sur l'origine et l'histoire des rythmes*, p. 33) that "rhythm is a discovery or rather an invention" ("le rythme a été une découverte ou plutôt une invention"). Conscious *ῥυθμοποιία* was no doubt an invention, — a very primitive one, however, — but that the rhythmical sense is innate, and that this sense was often aroused and satisfied without conscious *ῥυθμοποιία* on the part of men, I must claim, does not need proof. But what is the rhythmical sense? How is the feeling for rhythm satisfied? What is rhythm objectively considered? (I shall omit all theorizing about nerve-waves from the ear to the brain, and confine myself to well-known facts.) Strange as it seems, there is much variety of opinion, much confusion, on this subject. One would think that at least some common basis

could be found for all the notions of rhythm; that, for instance, all would agree that *time* has something to do with it; but no. We are told again and again that ancient rhythm was quantitative and modern rhythm accentual. This might be, and sometimes is, said in a correct sense; but close examination will often reveal the meaning to be that rhythm in the ancient languages resulted from some sort of a succession of long and short syllables, while in most modern languages, as in German and English, rhythm results from an analogous succession of accented and unaccented syllables, the perception of quantity or the time-element not entering even as a subordinate factor. Some deny absolutely that quantity has anything to do with modern rhythm as felt in poetry. Even those that admit the existence of quantity in modern languages differ widely from each other. Some are confident that all syllables are of the same length, while others maintain that only accented syllables are ever long. (I hope I may be permitted to ignore those who still persist in confounding quantity with quality.) Even Bulwer, in the Introduction to his Translation of Horace, p. xxxii, says: "In fact, as Dr. Kennedy has truly observed, the spondee is not attainable in our language, except by a very forced effort of pronunciation. That which passes current as an English spondee is really a trochee." But surely there is a sense of quantity in the modern ear; and, in my opinion, there are spondees in English. Let us consider Bulwer's remark. Apart from the fact that spondees may be made up by combining two words, it seems to me we have them also in the form of some compounds, such as 'breastplate,' 'firefly,' 'fireplace,' and some less conscious compounds, such as 'compounds,' 'household,' 'outside,' 'breastworks.' Simple spondaic words are, indeed, rare; but to say "There is no spondee in English" is like saying "There is no noun that rhymes with 'town'." 'Spondee' itself is a spondee; so is 'furlough,' 'gyrate,' etc. Compare 'furlough' with 'furrow.' I do not deny that many words in English admit of wider modifications of quantity than were allowed in Latin or Greek; but a man must have an extreme view of the elasticity and com-

pressibility of English words, who would undertake to reduce "Augur Apollo" and "Thou our chief — Caesar" to the same metrical form. The latter verse is one of the fruits of Bulwer's theory. (See Bulwer, Trans. Hor., pp. 48, 50.)

There are different kinds of rhythm, such, for instance, as the rhythm of acceleration heard in the drumming of a pheasant or the rocking of a somewhat unstable stack of saucers or plates; but the rhythm of music and poetry, both ancient and modern, not only depends on *quantity*, that is, *time*, but requires the recurrence of approximately equal units. The further we depart from absolute equality, the more defective is the rhythm. At what point the rhythmic effect ceases, I shall not undertake to say. It may be different with different persons. If the inequality ever steps beyond this limit, the rhythm is interrupted. If the new foot is one of a different structure and is repeated several times, we have a change of the *time*; if it is the same foot uttered more slowly or rapidly several times, it is a change of the *tempo*, or *ᾠωγή*. In the latter case the rhythm may be rendered continuous by a gradual acceleration or retardation in passing from one period to another; that is, the tempo may be changed gradually. But in the case of music or recitation accompanied by dance or march or any rhythmical movement, any appreciable inequality of feet or bars within the same colon is out of the question. Moreover, there can be no reasonable objection to using the scheme of this more exact rhythm in indicating the recitation toward which we are to approximate the *ψιλλὴ λέξις*. Westphal says that Aristoxenus would have denied the propriety of indicating the metre of recited poetry by means of musical notes. Of course so, if Westphal means the notes of *Greek* music, for these always indicate pitch, which we do not want, and never indicate quantity, which is the thing we do want; but let us hope that Aristoxenus would not have objected to the use of modern notes without any staff.

The rhythm, then, of ancient and modern verse, as well as of music, is the same. The units, however, are marked in a seemingly different way. The *ῥυθμοποιία* of English

poetry differs from that of Greek for two reasons: *first*, quantity in Greek, though by no means so mathematically exact as is sometimes supposed, was more constant and uniform than in English; and, *secondly*, in Greek the loudness of a long syllable was more conspicuous than the musical elevation of an accented syllable and so was used to mark feet, whereas in English the *accent* is chiefly loudness and is usually combined with more or less prolongation, so that the *accent* marks the feet. I spoke of the loudness of long syllables in Greek, rather than the ictus. An artificial ictus could be needed only when a spondee replaced a dactyl, or a tribrach replaced a trochee, or some such substitution took place. The question whether any ictus, or artificial stress of voice, was employed otherwise need not here be discussed. There is no mention of it in the works of Greek metricians or rhythmists. Some ancient writers, not without reason, excluded the spondee, as they excluded the pyrrhic, from the list of feet suited to continuous rhythm. Continuous spondaic rhythm may just as properly be regarded as a series of monosyllabic feet, which is a very monotonous sort of rhythm. Just as in Greek, then, a systematic succession of long and short syllables, so in English a systematic succession of accented and unaccented syllables constitutes a rhythmical series; *but it is just as essential that the complex units marked by accents in English should be equal as that the corresponding units marked by stress or loudness should be equal in Greek.*

When we sing, inasmuch as we proceed more slowly and dwell on the vowels, reducing the consonants to an inappreciable space of time, we are more conscious of the time occupied by the separate syllables or notes making up a bar than in ordinary recitation we are conscious of the time occupied by the individual syllables that compose a foot. This is true both of Greek (as attested by Aristoxenus) and of English. But it does not follow that we cannot *feel* the effect of the relative time of the syllables, nor that we cannot so utter a given group as to fill a given space of time. Even in singing and, as more frequently happens, in playing an instru-

ment, when we have a run of rapid notes, we can feel that we are giving each its correct time, although we cannot perceive distinctly the length of each, just as our auditory nerves can feel the effect of a more rapid or less rapid vibration of a sound-producing object, and we can with our voice make the number of vibrations per second required to produce a sound of a given pitch, although we have no conscious perception at all of the vibrations. (This, of course, is only an analogy, and it must not be urged too far.) But, granted that in the case of  $\psi\iota\lambda\eta\lambda\acute{\epsilon}\xi\iota\varsigma$  we cannot consciously produce the exact theoretical ratio between the times of syllables, we must remember that the recitation of the ancients was in many cases in exact rhythm, the units being marked by instruments or movements of the body, and we are surely justifiable in trying in our  $\psi\iota\lambda\eta\lambda\acute{\epsilon}\xi\iota\varsigma$  to approximate this exact rhythm, as when we read the trimeters of tragedy or the tetrameters of comedy, and in using analogous theoretical schemes even for the  $\psi\iota\lambda\eta\lambda\acute{\epsilon}\xi\iota\varsigma$  of the Greeks, as when we read the trimeters of comedy.

The views I have just expressed will, I am aware, be utterly rejected by some. After almost a lifetime of study, Westphal (Aristoxenus, p. 220) says: "Unser rhythmisches Gefühl ist schon befriedigt, wenn das Kolon oder die Periode eine gewisse Anzahl von Hebungen hören lässt: wie lange oder wie kurz die Stimme beim Aussprechen derselben verweilt, das irritirt uns nicht; wir gestatten gern und sehen gerade darin den Vorzug eines ausdrucksvollen Deklamirens, dass bei solchen Silben, welche für den logischen Zusammenhang besonders bedeutungsvoll sind, länger verweilt wird, einerlei ob durch längeres Aussprechen oder durch Pause. Und an welchen Stellen diese Pausen vorkommen, ob am Ende des Kolons oder innerhalb des Kolons und des Versfusses, ist uns einerlei." Then he shows that it is otherwise in singing. Now this variation of quantity of syllables and this introduction of pauses do undoubtedly render the declamation expressive, as he says; but is not the rhythm thereby rendered more defective? In the case of pauses indeed,

I believe we can, as it were, suspend the rhythmical sense and then resume it again; but on the whole all such devices of emphasis as those named seem to me to interfere with the rhythm. Consequently, in reciting poetry we depend chiefly upon the cadence in emphasizing the thought. Suppose there were no cola nor periods: could there not be any rhythm? It is a notorious fact that we can have rhythmical prose in both English and German, which would be impossible if the rhythm depended solely upon the *number* of the rhythmical accents. I have heard little girls reciting the multiplication table in perfect concert, making pauses to fill the place of the units when these were wanting; and I found that four uniform beats filled each bar or measure. These children had not been trained to recite in this way. Illustrations without end might be cited. In fact it seems to me that the rhythmical sense or sensation is the same in reciting as it is in singing. It should be remarked, however, that Westphal holds the rhythm of recited poetry in Greek to have differed from that of music in exactly the same way that he holds it does in German. This he attempts to show from Aristoxenus. For his arguments and the words of Aristoxenus, I must refer to the work just cited (especially pp. 220-225) and to Rossbach und Westphal, *Theorie der Musischen Künste*, Vol. I, pp. 42 ff., and III, *init.*

No one who has studied the fragments of Aristoxenus, or otherwise become acquainted with the nature and method of his investigations, will deny that everything he can be shown to have said regarding rhythm in Greek poetry and music must be accepted as final, unless it is positively self-contradictory or otherwise impossible. But, as every one knows, his work on rhythm is in a very fragmentary state. Under these circumstances the temptation is great to make the most of these fragments and draw from them as many even problematical inferences as possible; but the very opposite course is the only safe one to pursue. We must not assume that he teaches anything that is not plainly asserted or necessarily implied by his words. The chief object of this paper is to show that some of the doctrines ascribed to Aristoxenus are

not taught by him, and thereby to remove some obstacles that lie in the way of free and intelligent research.

We are now prepared to take up the practical part of our subject.

1. The use of *τονή* or *παρέκτασις*, that is, the prolongation of a single note or syllable into the time of a whole bar or foot, is rightly accepted by the interpreters of Aristoxenus, and calls for no discussion. Of course *ἐπέκτασις*, or the prolongation beyond the limits of a bar, no one would think of imitating in reading; and even in the case of *παρέκτασις* the rhythm of recitation may have sometimes departed from that of the same words as sung. Soph. Ant. 954, *κελαιναὶ νᾶες ἐκφύγοιεν*, was probably sung  $\cup \_ \_ \_ \cup \_ \cup \_ \_$ , but would naturally be read  $\cup \_ > \_ \cup \_ \cup \_ \cup$ . The Greeks composed their lyric poetry to be sung; still they sometimes read it, so that a double problem confronts us: *First*, what was the rhythm of the *music*? and, *secondly*, how did the ancients *read*? Except in the case of *ἐπέκτασις* (see Schol. Ar. Ran. 1348) we should probably approach as near to what we conceive to have been the musical rhythm as the ear will tolerate. The effect of *παρέκτασις* of monosyllables or ultimæ, especially *ἐν καταλήξει*, was not offensive, and was employed in recitation, for instance, in the elegiac hexameter. Of course part of the time, if the sense allows, can be filled with a pause, as is attested for the verse just named.

2. When a dactylic form occurs among trochaic forms, the following means may be employed to equalize the feet: *First*, the dactyl may be left pure and the trochee prolonged either by change of *ἀγωγή* or by *ἔκτασις* of the short ( $\_ >$ ), with change of *ἀγωγή* or (in music) without it, or by making the long triseme ( $\_ \cup$ ). *Secondly*, the trochee may be left pure, and the dactyl shortened by *ἀγωγή* (either the whole foot, or

the first two syllables,  $\overset{3}{\text{P}} \text{P} \text{P}$ ), or placed under the form  $\text{P} \cdot \text{P} \text{P}$ ,  $\sim \cup$ , or the form  $\text{P} \text{P} \text{P}$ ,  $\_ \sim$ . The prolongation of the trochee, advocated by some (Lehrs, Brill, etc.)



even in trochaic (and iambic) rhythm, does not come within the scope of this paper except in connection with the dactylo-epitrites, which will presently receive brief attention. Of the different methods of shortening the dactyl into a triseme foot, the first named, the change of tempo, is the only one that Westphal *now* considers admissible in view of the teachings of Aristoxenus; and it is not my purpose to try to show that this was not the ancient method: I desire only to show that in the other two methods, especially the former (— ∪), there is nothing positively conflicting with anything Aristoxenus teaches.

Let us first consider the so-called cyclic dactyl, — ∪. Two questions present themselves: *First*, does it belong, as Westphal maintains, only to *recited* poetry, or was it used also in singing? *Secondly*, what is its exact metrical form, or in other words, what time relation existed between its syllables?

The origin of the name and the authority for the existence of 'cyclic' feet, though familiar to all, must be stated here for reasons that will be apparent. Dionysius of Halicarnassus, De Comp. Verb. 17, while explaining the various feet, after describing the anapæst, says: ὁ δ' ἀπὸ τῆς μακρᾶς ἀρχόμενος, λήγων δ' ἐς τὰς βραχείας, δάκτυλος μὲν καλεῖται, πάννυ δ' ἐστὶ σεμνός, καὶ εἰς κάλλος ἁρμονίας ἀξιολογώτατος, καὶ τό γε ἡρωϊκὸν μέτρον ἀπὸ τούτου κοσμεῖται ὡς ἐπὶ τὸ πολὺ· παράδειγμα δ' αὐτοῦ τόδε·

Ἰλιόθεν με φέρων ἄνεμος Κικόνεσσι πέλασεν.

οἱ μέντοι ῥυθμικοὶ τούτου τοῦ ποδὸς τὴν μακρὰν βραχυτέραν εἶναί φασι πῆς τελείας, οὐκ ἔχοντες δὲ εἰπεῖν πόσῳ, καλοῦσιν αὐτὴν ἄλογον. ἕτερον δὲ ἀντίστροφόν τινα τούτῳ ῥυθμόν, ὃς ἀπὸ τῶν βραχειῶν ἀρξάμενος ἐπὶ τὴν ἄλογον τελευτᾷ, τοῦτον χωρίσαντες ἀπὸ τῶν ἀναπαίστων κύκλον καλοῦσι, παράδειγμα αὐτοῦ φέρουντες τοιούδε·

κέχυται πόλις ὑψίπολις κατὰ γᾶν.

This is awkwardly expressed. Hermann understands it as referring to the dactyls of the heroic verse in general; but we must either refer it to *all* dactyls, or else limit it to the

holodactylic hexameters (not, however, denying its applicability to other verses). That Dionysius really had in mind the latter will presently appear. It will be observed that the two feet he describes would have been the forms  $> \cup \cup$  and  $\cup \cup >$ , and in the case of the latter the *ἄρσις* would be  $\cup \cup$ , and the *θέσις*  $>$ . But in the same work, chap. 20, is an enumeration of the beauties of the holodactylic verse,

*αὐθις ἔπειτα πέδονδε κυλίνδετο λᾶς ἀναιδής,*

where, among other things, we read: *ἔπειθ' ἑπτακαίδεκα συλλαβῶν οὐσῶν ἐν τῷ στίχῳ, δέκα μὲν εἰσι βραχεῖαι συλλαβαί, ἑπτὰ δὲ μόναι μακραί καὶ οὐδ' αὐταὶ (αὐται?) τέλειοι . . . ὁ δὲ μάλιστα τῶν ἄλλων θαυμάζειν ἄξιον, ῥυθμὸς οὐδεὶς τῶν μακρῶν οὐ φύσιν ἔχουσι πίπτειν εἰς μέτρον ἡρῶν, οὔτε σπονδεῖος οὔτε βακχεῖος, ἐγκαταμέμικται τῷ στίχῳ πλὴν ἐπὶ τῆς πελευτῆς, οἱ δ' ἄλλοι πάντες δάκτυλοι, καὶ οὗτοί γε παραδεδιωγμένας ἔχοντες τὰς ἀλόγους, ὥστε μὴ διαφέρειν ἐνίους τῶν τροχαίων. οὐδὲν δὲ τὸ ἀντιπράττον ἔστιν εὐτροχον καὶ περιφερὴ καὶ καταρρέουσιν εἶναι τὴν φράσιν ἐκ τοιούτων συγκεροτημένην ῥυθμῶν.* This, too, is obscure. In Dionysius *ποιός* and *ῥυθμός* are synonymous. Here his remarks seem to imply that the shortening occurs only in the holodactylic verses. Moreover, though *ἐνίους* is not clear, we are certainly told either that *some* of the feet do not differ much from trochees, or that *according to some* the feet do not differ much from trochees.

In chapter 17 Hermann changed *κύκλον* into *κύκλιον* and transferred the name to the dactyls. Apel, who first discovered the significance of the passage, assumed a modification of the quantity of the first short, so that the irrational long and this short should form the *θέσις*, "so that the foot should not differ much from a trochee."

Now Westphal holds that this foot, whatever was its exact form, was used only in recitation, whereas Apel had assumed that it was a musical bar. The former thinks there can be no reasonable doubt that the ultimate authority of Dionysius was Aristoxenus himself, and I believe he is right; but how can Westphal reconcile this view with what he claims were

the teachings of Aristoxenus concerning the unconsciousness of quantity in recitation? He says (R. W., I. p. 53) expressly: "Den Rythmus eines declamirten Hexameters durch Notenzeichen auszudrücken, dem würde sich Aristoxenus widersetzen. Hat doch nach ihm die continuirliche Bewegung der Stimme, das Sprechen, keine ἡρεμίας, keine κατὰ τὸ πόσον γνώριμοι χρόνοι! Man vernimmt die sechs Hebungen des Hexameters, aber kann nicht mit den Fingern die Versfüsse als sechs gleich lange Hebungen und sechs gleich lange Senkungen taktiren." Then what could Aristoxenus mean by the τέλειαι when he says the μακραί differ from them in the holodactylic verse? How does he know they differ? Cf. also R. W., III, pp. 1-13, esp. p. 11.

Again, the cyclic anapaest mentioned must have been recited in the same way as the dactyl; if the one was merely declaimed, so was the other, and if the one was sung, so was the other. Now the example cited, *κέχυται πόλις ὑψίπολις κατὰ γᾶν*, does not belong to declaimed anapaests. The feet, indeed, form a dimeter, but the invariable caesura (masculine or feminine) is wanting.

Nothing can be safely inferred from the name κύκλιος. In the first place the MSS. have κύκλον, not κύκλιον. Since the foot is 'maimed' in a sense, *χωλόν* has been proposed. Less violent would be *κυλλόν*, and one might suspect a reference to this foot in Ar. Av. 1364, *τί δεῦρο πόδα σὺ κυλλὸν ἀνὰ κύκλον κυκλεῖς*; the words *ἀνὰ κύκλον* (cf. *ἀνακυκλικός*) could then refer to the anacyclic arrangement of vv. 1360, 1362,   
 ∪ ∪ — ∪ ∪ — ∪ ∪ — | — ∪ ∪ —, ∪ ∪ — ∪ ∪ — ∪ ∪ | ∪ ∪ — ∪ ∪ —.   
 At any rate, Cinesias was not lame (see the Scholia), and it is evident that reference is made to some peculiarity of his song and its rhythm and some dancing movement which he executed as he came up. But of course no conclusion can be drawn from such conjectures. In the second place, if we accept the adj. κύκλιος, it might, indeed, refer to the employment of the light anapaest by the song-twisting dithyrambic or cyclian poets; in which case it would be a musical foot, just as Cinesias was singing on the occasion referred to above (cf. 1367, *παῦσαι μελῳδῶν*); but it would more proba-

bly refer to the fact that the foot was *εὐτροχος καὶ περιφερής*, just as we hear of *ῥυθμοὶ στρογγύλοι* (Aristides, pp. 33, 98 M.), which move with undue rapidity. Christ (Griech. Met. p. 74) says that in Schol. Hephaest., p. 135 W., the choriambus *formed from a light dactyl*,  $\cup \cup \_$ , receives the name *πόδα κύκλιον*; but the Schol. here says nothing about a light dactyl, and the name may refer to the fact that the compound foot  $\_ \cup | \cup \_$  reads *ἀνὰ κύκλον*, the same way forward and backward.

But even discarding all inferences drawn from the name, there seems to be no good reason for limiting the cyclic dactyl to spoken poetry. The assumption of some that in the classic period the hexameter was never sung is certainly erroneous. It is sufficient to refer to the exquisite scene in Ar. Pax. 1265–1304, where one boy persists in singing passages of Homer, and another sings an elegy of Archilochus.

The second question relates to the metrical form of the cyclic dactyl. Apel, who first called attention to the authority

for it, assumed that it varied between  $\text{♩} \cdot \text{♩} \text{♩}$  and  $\text{♩}^3 \text{♩} \text{♩}$ .

The latter, adopted by Westphal, is not so easily produced as the former, and need not be given preference unless there is some serious objection to the former, adopted by J. H. H. Schmidt and many others. For purposes of reading, the question, it must be admitted, is rather theoretical than practical. It would require a very delicate ear to discover any difference between the extremes proposed by Apel. Still it may be worth while to show that the objections that have been made to the theoretical form,  $\text{♩} \cdot \text{♩} \text{♩}$ , are not well founded.

An objection, which I have somewhere met, is that this form of foot conflicts with the doctrine of Aristoxenus, that the triple ratio is unrhythmical. But Aristoxenus, when he makes this statement, is speaking solely of the ratio between arsis and thesis, as any one may see by examining the passage. He is speaking of the *λόγος ποδικός* of the *ποὺς τετράσημος*. The *ποικιλίαι* of the *χρόνοι ῥυθμοποιίας ἴδιοι*,


of which he speaks, might very well include the cyclic dactyl under the form in question.

Another objection, raised by Westphal, is that the ratio of a long to a short in poetry that is sung is always as 2 to 1, according to Aristoxenus, — a rule which Westphal himself has been compelled to arbitrarily modify so as to make it applicable only to a long and a short immediately following it. The statement that the ratio is 2 : 1 is made by Quintilian, *Inst.* ix. 4. 45, and it occurs also in the *Paralambanomena* of Psellus, § 1, under peculiar circumstances. He speaks of the syllable as having been considered the measure (smallest unit) of rhythm by the *παλαιοὶ ῥυθμικοί*, and adds: *ὁ δέ γε Ἀριστοξένος οὐκ ἔστι, φησί, μέτρον ἢ συλλαβή. πᾶν γὰρ μέτρον αὐτό τε ὠρισμένον ἐστὶ κατὰ τὸ ποσὸν καὶ πρὸς τὸ μετρούμενον ὠρισμένως ἔχει. ἡ δὲ συλλαβὴ οὐκ ἔστι κατὰ τοῦτο ὠρισμένη πρὸς τὸν ῥυθμὸν ὥς τὸ μέτρον πρὸς τὸ μετρούμενον, ἡ γὰρ συλλαβὴ οὐκ ἀεὶ τὸν αὐτὸν χρόνον κατέχει, τὸ δὲ μέτρον ἡρεμεῖν δεῖ κατὰ τὸ ποσὸν καθὼς μέτρον ἐστὶ καὶ τὸ χρόνου μέτρον ὡσαύτως κατὰ τὸ ἐν τῷ χρόνῳ ποσόν, ἡ δὲ συλλαβὴ χρόνου τινὸς μέτρον οὐσα οὐκ ἡρεμεῖ κατὰ τὸν χρόνον, μεγέθη μὲν γὰρ χρόνων οὐκ ἀεὶ τὰ αὐτὰ κατέχουσιν αἱ συλλαβαί, λόγον μέντοι τὸν αὐτὸν ἀεὶ τῶν μεγεθῶν· ἥμισυ μὲν γὰρ κατέχειν τὴν βραχεῖαν χρόνου, διπλασίαν δὲ τὴν μακράν* — here the sentence breaks off. Westphal suspects that we have the substance of the incomplete sentence in Quintilian, l.c., “*Longam esse duorum temporum, brevem unius, etiam pueri sciunt.*” This conjecture I shall not discuss. In the passage of Psellus, it is not certain that the author is quoting literally, and from *λόγον μέντοι* onward sounds very much like an addition of his own. I do not believe that Aristoxenus is the author of those words, and no matter who is the author, the remark seems to me meaningless, unless it refers to change of *ἀγωγή*. But that it cannot refer to *ἀγωγή*, if it is a remark of Aristoxenus, follows from the fact that, according to that author, the *χρόνος πρῶτος*, the true unit of rhythm, may vary with the *ἀγωγή*, so that after all the *χρόνος πρῶτος* and the short syllable would cover the same space of time under all circumstances, and it would be

a quibble to say that the one is the μέτρον, but the other is not. Westphal, who fully recognizes that the remark cannot refer to change of ἀγωγή, draws this conclusion: "Der von den Metrikern oft wiederholte Satz der rhythmici und musici, dass die Kürze nicht immer einzeitig, die Länge nicht immer zweizeitig sei, ist also auch ein Satz des musicus Aristoxenus." But he does not show how the quantity, apart from ἀγωγή, can vary and the ratio remain constant. Is it true that when a word contains one long that is longer than those of another word, then any other long it may contain must also be longer by the same amount, and also its shorts must be longer in the same proportion? That surely cannot be meant. If the remark referred to the spoken words of prose or loose verse, the remark about ratio would be erroneous; if it refers to sung poetry or παρακαταλογία, it can apply with sense only to change of ἀγωγή, which would convict Aristoxenus of inconsistency if he were the author. The truth of the matter is, that if the remark has reference to singing alone, as is assumed, it is hard to see under any assumption what could be meant but change of ἀγωγή, since it is notorious that the music regulates the varying quantity of prose or recited poetry.

Be all this as it may, and let it be granted that the remark was made by Aristoxenus and that it does not refer to ἀγωγή, it still leaves some other ratio than 2 : 1 possible in special cases; for Aristoxenus himself mentions other exceptions in their places, and might, even in the lost part of this passage, have mentioned this exception.

Another objection is the fact that the foot in question contains a syllable that is shorter than the χρόνος πρῶτος. Now Aristoxenus defines the χρόνος πρῶτος thus (§ 10): Καλείσθω δὲ πρῶτος μὲν τῶν χρόνων ὁ ὑπὸ μηδενὸς τῶν ῥυθμιζομένων δυνατὸς ὢν διαιρεθῆναι, δίσημος δὲ ὁ δις τούτῳ καταμετρούμενος, κτέ. Then again (§ 12): Ἐν ᾧ δὲ χρόνῳ μήτε δύο φθόγγοι δύνανται τεθῆναι κατὰ μηδένα τρόπον, μήτε δύο ξυλλαβαί, μήτε δύο σημεῖα, τοῦτον πρῶτον ἐρούμεν χρόνον. The former passage admits of being interpreted in the light of the latter: the χρόνος πρῶτος cannot be divided into *two* parts. Another

remark is more difficult to reconcile (§ 11) : δῆλον ὅτι ἀναγκαῖόν ἐστιν εἶναι τινὰς ἐλαχίστους χρόνους, ἐν οἷς ὁ μελωδῶν θήσει τῶν φθόγγων ἕκαστον. ὁ αὐτὸς δὲ λόγος καὶ περὶ τῶν ξυλλαβῶν δῆλον ὅτι καὶ περὶ τῶν σημείων. To get a satisfactory sense Westphal reads τῶν χρόνων for χρόνους. Even if we accept this, when we consider the explicit nature of the passage I cited just now (§ 12), and the fact that it immediately *follows* the one last named, and consider the further fact that we find mention of “syllabae breviores brevibus,” and that, in any case, the cyclic dactyl is an irrational, hence an exceptional foot, we are justified in assuming that this may be a case in which a syllable occupies less time than the χρόνος πρῶτος. An irrational and fractional short is distinctly mentioned by Bacchius (p. 24 M.), probably on the authority of Aristoxenus : τὸν δὲ ἀνὰ μέσον τῆς ἄρσεως καὶ τῆς θέσεως χρόνον οὐκ ἄξιον ἐπιζητεῖν, ὥς ὄντα τινὰ τῶν κατὰ μέρος· διὰ γὰρ τὴν βραχύτητα λανθάνει καὶ τὴν ὄψιν καὶ τὴν ἀκοήν, κτέ. In practice this is what we really do with the middle syllable, and Christ (p. 77) thinks it unwise to attempt anything definite. But when Brambach, who holds that the acceleration is due solely to ἀγωγή (Rhyth. und met. Untersuchungen, p. 170), says : “Die Uebersetzung in unsere Tactschrift ist daher streng genommen unmöglich,” and, again, “Ganz falsch ist die allerdings bequemste Uebersetzung des Daktylus ; denn sie hebt das Verhältniss der ersten Kürze zur Länge auf, und es entsteht die ungriechische Tactfügung  $\frac{3}{16} \frac{1}{16} \frac{2}{16}$  mit dem unmöglichen Verhältnisse 3 : 1 : 2,” he seems in the first passage to speak, perhaps, rather positively, and in the second to beg the question. *Why* is the relation 3 : 1 : 2 “impossible” or “ungriechisch”?

Next let us glance at the choreic dactyl, — ∞. For this there is no ancient testimony ; but the structure of some verses renders its existence probable. The only objections to it are the disturbed relation of long to short (which has already been discussed) and Aristoxenus’ definition of the χρόνος πρῶτος. But here the two shorts exceed a χρόνος πρῶτος, as they are equivalent to an irrational long ; for the musical notes do not express the exact value.

Sometimes it is difficult which form of light dactyl is to be selected for theoretical representation. I am inclined to believe that in recited trochaic verses the tendency would be to employ the choreic dactyl, always, however, bearing the sense in mind. There is little doubt that any of the methods named, including the accelerated *ἀγωγή*, could be employed according to exigency. I wish, however, to direct attention to the fact that the corresponding *πόδες ἀντίστροφοι*, the light anapaests, of iambic rhythm, would not admit of the process known as “treating with anacrusis” if we in so doing introduce the cyclic dactyl; for in a verse like Soph. Ant. 11, *ἐμοὶ μὲν οὐδείς μῦθος, Ἀντιγόνη, φίλων*, would, with the ascending rhythm (alone recognized by the ancients) become  $\cup \_ | \cup \_ | > \_ | \cup \_ \sim | \cup \_ | \cup \_ ||$ . This, to my ear, is the more agreeable way; but the ancients, without sign of varying, pronounce such forms as *-τιγόνη* here, anapaests. Christ objects to  $\_ \sim$  on the ground that it often leads to two irrational shorts where one irrational long is not allowed. This objection is not insurmountable. While the essence of rhythm is time, as indicated by marked units, still loudness adds something to the rhythmic effect. A spondee in dactyls makes the movement appear slow, although it takes the same time as a dactyl. This is because the voice reaches a fuller compass on a long syllable than on a short, so that two shorts, though equal in length to one long, represent less sound. They are, so to speak, as long but not as broad. Hence it is clear that a choreic dactyl resembles a trochee more than does the irrational choree. So, *mutatis mutandis*, in the ascending rhythm. This fact was overlooked by Hephaestion when he pronounced the anapaests in even places *ἄλογοι*, i.e. ‘unreasonable,’ not ‘irrational.’

Just where the cyclic anapaests mentioned by Dionysius were used we do not know. If by *ἀντίστροφος* he means *exactly* reversed, the anapaest becomes  $\cup \_ \sim$ , which some use in iambs. This implies a different scansion from that which we obtain by “treating with anacrusis” and introducing  $\sim \cup$ . (It may be remarked, however, that Aristides (p. 39) mentions  $\_ \cup \cup$  and speaks of  $\cup \cup \_$  as being *κατ’ ἀντίστρο-*



φὴν τοῦ προτέρου, where the one is not exactly the reverse of the other; but the ancients always disregard the ictus in such matters.) I cannot say that  $\cup \cup$  is wrong. We must always remember that 'anacrusis' means 'Aufschlag' or 'Auf-tact' (that is, ἄρσις), invented by Hermann to express an idea of Bentley's apparently unknown to the ancients.

It would be interesting to know where the ancients would have drawn the line between ἄρσις and θέσις in  $\cup \cup$ . The ictus clearly could not fall on the middle syllable. But the question is not resolved even for the cyclic *dactyl*; for as it is attested as occurring in the dactylic hexameter, some think that the irrational long was still the θέσις, and the short syllables the ἄρσις. As a matter of fact this is a purely theoretical question, and its answer does not affect the recitation.

3. We now take up the case where *spondaic* forms occur among triseme feet, and consider the irrational choree. Here Aristoxenus is very explicit. One would think, at first sight, that there was no possibility of misunderstanding him; but it seems to me, nevertheless, that he has been misunderstood. But let us first consider the various views. J. H. H. Schmidt, if I understand him, makes the irrational choree exactly equal *in time* to the pure trochee, the only difference being the more vigorous utterance of the irrational syllable than of the short. In this he virtually follows Apel. Boeckh, too, made the irrational choree exactly equal to the trochee, but maintained the ratio  $2:1\frac{1}{2}$  instead of  $2:1$ . He attempted to express such time values by numerals ( $\frac{1}{7} + \frac{2}{7} = 3$ ), at which Hermann exclaimed "cui rite exsequendae ipse Apollo impar sit," as if it were anything but  $2 + 1\frac{1}{2}$  accelerated by ἀγωγή.

Now let us examine Aristoxenus. His words are (§ 20): "Ὁρισται δὲ τῶν ποδῶν ἕκαστος ἥτοι λόγῳ τινὶ ἢ ἀλογίᾳ τοιαύτη, ἥτις δύο λόγων γνωρίμων τῇ αἰσθήσει ἀνὰ μέσον ἔσται. γένοιτο δ' ἂν τὸ εἰρημένον ὧδε καταφανές· εἰ λειφθείησαν δύο πόδες, ὁ μὲν ἴσον τὸ ἄνω τῷ κάτω ἔχων καὶ δίσημον ἑκάτερον, ὁ δὲ τὸ μὲν κάτω δίσημον, τὸ δὲ ἄνω ἡμισυ, τρίτος δὲ τις ληφθείη πούς παρὰ τούτους, τὴν μὲν βάσιν ἴσῃ αὐτοῖς ἀμφοτέροις ἔχων, τὴν δὲ ἄρσιν μέσον μέγεθος ἔχουσιν τῶν

ἄρσεων. ὁ γὰρ τοιοῦτος ποὺς ἄλογον μὲν ἔξει τὸ ἄνω πρὸς τὸ κάτω· ἔσται δ' ἡ ἀλογία μεταξὺ δύο λόγων γνωρίμων τῇ αἰσθήσει, τοῦ τε ἴσου καὶ τοῦ διπλασίου. καλεῖται δ' οὗτος χορεῖος ἄλογος.

It appears to me hopeless to try to reconcile this with Schmidt's practice. The question may well be raised whether by μέσος, μέσον, μεταξύ, Aristoxenus really means 'exactly in the middle,' as Westphal understands. An illustration which A. draws from melody seems to indicate that such is really his meaning; but a close examination will show rather that he chose, for the sake of clearness, to describe a *particular case*, both as to the ἀλογία and its analogue. Accordingly we read in Bacchius (p. 23): "Ἀλογος δὲ ποῖος; — Ὁ τοῦ μὲν βραχέος μακρότερος, τοῦ δὲ μακροῦ ἐλάσσων ὑπάρχων· ὁπόσῳ δὲ ἐστὶν ἐλάσσων ἢ μείζων διὰ τὸ λόγῳ εἶναι δυσαπόδοτον, ἐξ αὐτοῦ τοῦ συμβεβηκότος ἄλογος ἐκλήθη. (See also Dionysius on the cyclic dactyl.) Still we can never make it appear that the χρόνος ἄλογος can actually become equal to one of the limits between which it falls. But Westphal goes further, and says that these remarks of A. clearly disprove Boeckh's view, because the θέσις or βάσις of the irrational choree, according to A., is "equal to the diseme θέσις of the rational spondee." This objection to Boeckh's method of equalizing bars has been accepted by able metricians, among them Brambach, and deserves a careful examination. If the Greeks actually allowed feet bearing the relation of 6:7 to stand side by side in the same colon, what right have we ever to insist upon a greater approximation than this to equality? In fact, why may we not admit the relation of 3:4 and mix true dactyls with true trochees? Let us see. Aristoxenus is here speaking of λόγος, 'ratio,' and that only. He says that each foot is determined either by some λόγος or such an ἀλογία as shall lie between (ἀνὰ μέσον) two λόγοι that can be perceived (that is, whose value can be definitely fixed by the senses). (We should have a right to ask him how he knows it lies *in the middle* (ἀνὰ μέσον) unless it is itself τῶν γνωρίμων; but of this I have already spoken.) To a Greek the notion of a *ratio* lying

between two *ratios*, or being an average between two ratios, was likely to be obscure. A ratio is not a quantity, nor a fraction, nor a number: it is a relation. So Aristoxenus undertakes to make the matter clear. *For the purpose of illustration* (observe his words) he makes the purely ideal assumption, "if two *were* taken," etc., then adds that such a foot will have its *ἄρσις* irrational with respect to its *θέσις*, i.e. the *λόγος* is *ἄλογος*, but does not say it will have an irrational *ἄρσις* as compared with the *ἄρσεις* of other feet. It is, therefore, evident that the true spondee and the true trochee, placed on each side of the irrational choree, are purely auxiliary and intended solely to make clear the meaning of *ἀλογία*. They do not and cannot both actually occur in the same series or colon with the irrational foot. If we could have a rational spondee, then an irrational choree, then a rational trochee, all in a series, we might as well despair. In my opinion, after the *ἀλογία* has been made clear, we are to remove the other two feet, just as we remove the wooden framework on which we have erected a stone arch.

It is very strange that Rossbach (Griech. Met., p. 430) should totally misconceive this matter. I have read and re-read his remark; but no eye-rubbing elicits any but an erroneous meaning. He says: "Von dieser Boeckhschen Messung widerspricht zunächst die auf  $1\frac{2}{7} + \frac{9}{7}$  angegebene Grösse des Spondeus (irrationalen Trochäus) der Ueberlieferung des Aristoxenus; denn ihr zufolge sind die beiden Silben des irrationalen Trochäus genau einander gleich"; that is, according to the tradition of Aristoxenus "the two syllables of the irrational choree are exactly equal to each other." Westphal's  $2 : 2\frac{1}{2}$  (Aristox. p. 152) is a misprint.

4. Some remarks on the nature of *ἀλογία* are called for, both in reference to the irrational choree and the cyclic dactyl. It may seem strange that there could be any question as to an exact definable ratio when two quantities are 'irrational'; and Westphal, who believes in the definite ratio  $2 : 1\frac{1}{2}$ , that is,  $4 : 3$ , strangely says that 'irrational' in Aristoxenus means 'incommensurable.' The word does, indeed, sometimes have that meaning, but Aristoxenus ex-

plicitly warns us against misunderstanding, and gives an explanation that seems to show that he was guarding us against the mathematical interpretation. The Elements of Euclid had not yet appeared; but an Aristoxenus could not have been ignorant of the nature of incommensurability. The *ἄλογον* and the *ῥητὸν χρόνου μέγεθος*, he says, have no *μέτρον κοινὸν ἔνρυθμον*. This shows, by the way, that the shortened short, which is a *κοινὸν μέτρον*, cannot be *ἐνρυθμον*; and the analogy which he draws from the intervals of melody seems to imply that this short, like an *ἀμελῶδητον*, has no separate existence. This seems to militate against the cyclic dactyl,  $\sim \cup$ . But, in the first place, the short is not *ἐνρυθμον*, as it is inseparable from another element with which it makes a *χρόνος ποδικός*; that is, it is a *χρόνος ῥυθμοποιίας ἴδιος*. In the second place, the analogy mentioned is in a corrupt passage, and besides, like all analogies, must not be pressed. This and most of the other seeming objections to

$\sim \cup$  cannot be made against  $\overset{3}{\text{♩}} \text{♩}$ . The latter seems to me less natural; but it cannot be shown to be incorrect. My only object has been to show that  $\sim \cup$  does not conflict with any unmistakable declaration of Aristoxenus, and that his definition of irrationality does not force us to make  $\text{—} >$  longer than  $\text{—} \cup$ . Other irrational feet, such as  $\cup \cup >$ , do not call for special discussion; only we must remember that the forms assigned by Dionysius to the cyclic dactyl and anapaest themselves are  $> \cup \cup$  and  $\cup \cup >$ , and that there is no other explicit testimony for triseme dactyls and anapaests.

5. It would require much time to discuss the dactylo-epitrites. Aristoxenus pronounces the ratio 3 : 4 (the *λόγος ἐπί-τριτος*) unrhythmical. Hence the compound foot,  $\text{—} \cup \text{—}$ , is inadmissible. The theory of Boeckh, which makes a dactyl and an epitrite equal, it is now needless to discuss. His theory possesses the merit of making the seeming trochee and the seeming spondee equal. Schmidt's scheme,  $\text{—} \cup | \text{—}$ , introduces the *λόγος τριπλάσιος*, and so has been emphatically rejected. But Aristoxenus must be once more consulted. He tells us distinctly that he is speaking of

ῥυθμὸς συνεχής, 'continuous rhythm.' This term, according to Westphal, is applicable to a series of *two* or more units, and I see no reason to deny the correctness of his interpretation, though it is hardly demonstrated to be correct. Assuming it to be correct, we find  $\_ \cup \_ \_$  wrong, because the λόγος ἐπίτριτος is ἄρρυθμος in ῥυθμὸς συνεχής, and  $\_ \cup \_ \_$  is sometimes repeated in a series; but  $\_ \cup \_ \_$  is *not* forbidden, because  $\_ \cup$  is *not* repeated in a series. When the spondee is represented by a trochaic form, we cannot write  $\_ \cup$ . Whether Schmidt in this case wrote his  $\_ >$  (here an irrational *spondee*) out of respect for the law laid down by Aristoxenus, or because he saw an incongruity between  $\_ \_$  and  $\_ \cup$  as representatives of the same bar in the same situation, I am unable to say; but I think he proceeded entirely independently of Aristoxenus. Here, then, we *seem* to have the λόγος ἐπίτριτος alternating with the λόγος ἴσος, which is analogous to  $\_ \cup \_ >$ , in which the λόγος διπλάσιος alternates with ἀλογία, approximating the λόγος ἐπίτριτος (arrhythmic). It is true, we find no mention of a tetraseme trochee; but would not Aristoxenus have called  $\_ \cup$  a dactyl, in which the χρόνοι ῥυθμοποιίας ἴδιου do not coincide with the χρόνοι ποδικοί, but one of them παραλλάσσει ἐπὶ τὸ μέγα ( $\_$  greater than  $\_$ ), and the other ἐπὶ τὸ μικρόν,  $\cup$  less than  $\cup \cup$ ? See Psellus, § 8. In modern music the ratio of 3 : 1 in the ῥυθμοποιία frequently occurs in the ῥυθμὸς ἴσος, as in "Auld Lang Syne," and the familiar tune "Perez." In singing such a  $\frac{3}{4}$  bar as  $\text{♩} \cdot \text{♩}$ , you will often hear the singer give his voice an impulse when it reaches the end of one quarter. He feels that the second χρόνος ποδικός begins, although the first χρόνος ῥυθμοποιίας ἴδιος is not exhausted. In my opinion the best way to practically *read* the dactylo-epitrites is to reduce the feet all to three χρόνοι πῶτοι,  $\_ \cup \_ > \_ \cup \_ \cup \_ \_$ .

6. It has been asserted and insisted upon that the ancients knew nothing about equality of bars. Their silence is assumed as conclusive that bars in the same series were not necessarily equal. I have heard the demand made of those that use the ancient pronunciation of Latin, that they should produce an explicit statement that *c* never has the sound of *s*.

But who expects to find in an English grammar a statement that *q* never has the sound of *z*? The ancient Romans had never dreamed of anything but a hard *c* (kay). Now, how, if the Greeks never dreamed of rhythm with other than equal bars? Of course, in case of *μεταβολή*, which is fully provided for by the ancients, there is no real exception, as the rhythm is not continuous, but a change at every foot or two would not be change of rhythm; it would be no rhythm at all. If we continue the alternation of the same pair of unequal feet, there is, indeed, rhythm; but the rhythm is due to the fact that the two feet then become one compound foot.

Everything said about rhythm implies at least an approximation to equality. The *χορείος ἄλλογος*, even if we admitted its inequality, would be an exception that proves a rule; for what is its *raison d'être*?

There are other cases than those I have enumerated, in which the question of equalizing the feet or bars arises; but it has not been my purpose to treat the whole subject, but to show that some objections to particular cases are not well founded, and I would not make the impression that I consider as correct all the theories that I have defended as being possible.